

THE IDENTITY OF *ALOE DELTOIDEODONTA* BAKER

With Notes on Perrier's Varieties, and with Descriptions of
Three New Species.

By G. W. REYNOLDS.

(With Plates XVIII—XXVII.)

There appears to be no locality known in Madagascar today where *A. deltoideodonta* Bak., as described, is to be found.

The type is Baron 946! received at Kew in October 1882, from "Central Madagascar", without precise locality. This comprises one leaf and an inflorescence. A second sheet, Baron 5181! "chiefly from north-west Madagascar" comprises a whole flowering plant with a second inflorescence. The 10 cm. slender stem of this specimen is of the kind that suggests it is a sucker taken from a group, and that plants are proliferous.

Photographs of these two sheets are reproduced herein. (Plates XVIII—XIX.)

Little is known in botanical literature about the Rev. R. Baron who collected about 11,800 specimens in Madagascar between the years 1880 and 1896. Baron lived in Fianarantsoa (430 km. south of Tananarive), and collected many plants on the southern part of the ridge of high ground running south through Central Madagascar in the country known as Betsileo. The type might have been collected somewhere in this wide area, and it is not known whether it was taken from a juvenile or adult plant.

A. Rossi Todaro in *Hort. Bot. Panorm.* 2: 58, *tab.* 40 (1894) is placed by Berger in synonymy under *A. deltoideodonta* Bak., but this appears to be incorrect. Todaro states that his plant came from Madagascar and that the seeds were mixed with those of *A. percrassa* Tod. *Tab.* 40 depicts a raceme that is too densely flowered for *A. deltoideodonta*, while the leaf, which is 20 cm. long and 9 cm. broad, is much too large for *A. deltoideodonta*. The leaf also has a very prominent dentate keel dorsally throughout which is a character neither of *A. deltoideodonta* nor of *A. percrassa* which I have seen in large numbers in Northern Ethiopia and on the Kohaito Plateau in Eritrea. No species with such dentate-keeled leaves is known to me in Madagascar.

Perrier de la Bâthie does not appear to have collected typical *A. deltoideodonta* anywhere in Madagascar, and he cites no material of his

own collecting either in *Mém. Soc. Linn. Norm.* 1: fasc. 1 (1926) or in *Fl. Madag. Liliac.* (1938).

Perrier did however describe four varieties of *A. deltoideodonta* in *Mém. Soc. Linn. Norm. (l.c.)* namely var. *candicans*, var. *intermedia*, var. *brevifolia* and var. *contigua*.

In the light of recent investigations it seems that of these four, only the varieties *candicans* and *brevifolia* should now be upheld. The varieties *contigua* and *intermedia* differ in too many characters to be varieties of *A. deltoideodonta* and should be accorded distinct specific rank.

The purpose of this paper is, therefore, to publish photographs of Baron's material of *A. deltoideodonta* since no figures are known, and to give effect to the proposals concerning the varieties.

A. deltoideodonta Baker in *Journ. Linn. Soc.* 20: 271 (1883); Durand et Schinz in *Consp. Fl. Afr.* 305 (1893); Berger in *Engler Pflanzenr. Liliac.*—Aloin. 186 (1908); H. Perrier de la Bâthie in *Mém. Soc. Linn. Norm.* 1: fasc. 1, 24 (1926), et *Fl. Madag. Liliac.* 85 (1938).—Non François in *Mém. Acad. Malg.* fasc. 24: plate 18 (1937).—*A. Rossi* Todaro in *Hort. Bot. Panorm.* 2: 58, tab. 40 (1894) *vide* Berger (*l.c.*).

DESCRIPTION based on Baker's account and Baron's material:

Plant small, acaulous or with short stem, probably proliferous.

Leaves 12—16, densely rosulate, lanceolate-deltoid, erectly spreading, 10—13 cm. long, 2.5—3 cm. broad, probably without spots; *margins* with continuous cartilaginous or horny narrow straw-coloured border armed with teeth of the same colour, deltoid, 2 mm. long, 3—5 mm. apart.

Inflorescence simple or 1—2-branched, 40—60 cm. tall, the peduncle slender, basally flattened and about 12 mm. broad, terete upwards.

Racemes rather narrowly cylindric-acuminate and narrowing almost to a point, 15—20 cm. long, subdensely flowered, the youngest buds suberect and almost hidden by their bracts, gradually laxer downwards.

Bracts lanceolate-deltoid, white, shorter than the pedicels, about 10 mm. long, 5-nerved.

Pedicels the lowest 10—12 mm. long.

Perianth probably scarlet and cylindric, 25 mm. long (dry), obtusely tapering at base into the pedicel; *outer segments* free for about 10 mm.

Filaments not or very shortly exserted. (Plates XVIII, XIX.)

Central Madagascar; Rev. R. Baron 946! holotype (K), 752! 5181! (K).—Received at Kew in October 1882, October 1881, and September 1887 respectively.

A. deltoideodonta Bak. var. *candicans* H. Perr. in *Mém. Soc. Linn. Norm. (l.c.)* 25, et *Fl. Madag. (l.c.)* 86.



PLATE XVIII. *Aloe deltoideodonta* Baker.

Photography of the type in Kew, Baron 946 on right. Baron 752 on left.
—By courtesy of Dr. R. A. Dyer, Chief, Division of Botany, Pretoria.



PLATE XIX. *Aloe deltoideodonta* Baker.

Photograph of Baron 5181 in Kew.

—By courtesy of Dr. R. A. Dyer, Chief, Division of Botany, Pretoria.



PLATE XX. *A. deltoideodonta* Bak. var. *candicans* H. Perr.

Plant from Ivohipolaka, Madagascar, flowering in Johannesburg. Height 55 cm.
Flowers 1/1 from bud to post-pollination stage.



PLATE XXI. *Aloe deltoideodonta* Bak. var. *candicans* H. Perr.
 Plant from the north end of the Andringitra Range, near Mahaso, flowering in
 Johannesburg. Height 60 cm.
 Flowers 1/1 from bud to post-pollination stage.

Differs from the type in having much larger leaves, shorter more conical racemes, longer and broader snow-white brittle bracts that are usually longer than the pedicels.

DESCRIPTION based on observations in Betsileo, Madagascar, and on plants flowering in Johannesburg:

Plants with little or no stem, usually forming dense groups 1—2 m. and more across.

Leaves 12—16, rosulate, compactly ascending, lanceolate-attenuate, averaging 15—20 cm. long, 5—6 cm. broad; *upper surface* flat to slightly canaliculate, grey-green with reddish tinge, obscurely lineate, the nerves 1—2 mm. apart; *lower surface* rounded, similar to upper surface; *margins* with slight cartilaginous edge armed with pale teeth 1—2 mm. long, 5—8 mm. apart.

Inflorescence simple or 1—2-branched, 35—50 cm. high.

Peduncle flattened and 10—14 mm. broad at base; when simple, clothed with a few sterile-bracts that are ovate-acute, 15 mm. long, 7 mm. broad, thin, scarious, brittle, very white, many-nerved.

Racemes cylindric-conical, 10—12 cm. long, 6 cm. diam., the apex a tuft of dry white bracts, apical buds denser and almost hidden by their white bracts, laxer downwards, open flowers nutant to subpendulous.

Bracts usually longer than the pedicels, ovate-acute, thin, scarious, brittle, very white, about 9-nerved, usually deflexed near base, about 15 mm. long, 7—8 mm. broad.

Pedicels 12—16 mm. long.

Perianth pale-scarlet, 25—30 mm. long, cylindric, slightly curved-clavate, basally obtuse, 6 mm. diam. across the ovary, slightly constricted above the ovary, thence slightly decurved and enlarging to an open mouth; *outer segments* free for two-thirds their length, thinner and paler at the margins, obscurely 5-nerved, apices subacute, spreading; *inner segments* broader than the outer, with prominent scarlet keel, the apices more obtuse and more spreading than the outer.

Filaments pale-rose, the 3 inner narrower and lengthening before the 3 outer with their *anthers* in turn exerted 1—2 mm.

Stigma at length exerted 2—3 mm. *Ovary* dark olive-green, 6 mm. long, 2.5 mm. diam., obtuse at apex (Plates XX, XXI.)

Fianarantsoa Province: Betsileo, Ikalamavony (north-west of Fianarantsoa) 800 m. alt., form with broad leaves, Perrier 13121! (P); form with leaves averaging 30 cm. long, 5 cm. broad, Perrier 13121 *bis*! (P); Mont Amboloandro near Zazafotsy, alt. 800 m., rocky places with xerophytes, leaves 16—18 cm. long, 5—7 cm. broad, March 1912, Perrier 11026! (P); ex Ivohipolaka, cult. Johannesburg, 9 March 1952, Reynolds 6208 (PRE).

DISTRIBUTION: In considerable numbers on semi-denuded rocks and pavements at km. 22, 32, 47, 49 and 52 north-east of Zazafotsy on the road to Ambalavao, alt. 660 m.—720 m.; at foot of the southern end of the Andringitra range 24 km. north of Ivohibe, 660 m.; north end of the Andringitra near Mahasoia; Ikalamavony; Ivohipolaka.

In Johannesburg plants flower in March.

A. deltoideodonta Baker var. *brevifolia* H. Perr. in *Mém. Soc. Linn. Norm. (l.c.)* 24, et *Fl. Madag. (l.c.)* 86.

Tulear Province. Betioky District; Denuded sandstones near Benenitra (Onilahy Valley), c. 100 m. alt., July 1919, Perrier 12740! type (P).

Perrier states that his var. *brevifolia* has "leaves at least 50 mm. broad," but his type (Perrier 12740) comprises two very small plants with leaves up to 10 cm. long, but only 2.5 cm. broad, with marginal teeth 1.5—2 mm. long and 2—5 mm. apart. The inflorescence is simple and 30 cm. tall, with raceme cylindric, 6—10 cm. long, subaxly flowered. Bracts are thin, white, 10 mm. long, 4 mm. broad. Pedicels about 12 mm. long. Perianth 22 mm. long (dry)—possibly 25 mm. or more when alive. (Plate XXII.)

This material in rosettes, leaves and marginal teeth, bears a striking resemblance to Baron 5181—*A. deltoideodonta* Bak.—but in the latter the inflorescence is 60 cm. tall with racemes 18 cm. long. Perrier also has a note, "In the same locality (i.e. Benenitra) I have found a different form (Perrier 13496) with still broader leaves, 7 cm. and more, with the surface covered with scattered small white spots and with bracts that are shorter than half the length of the pedicels."

Perrier 13496! has a leaf 25 cm. long, 10 cm. broad, which closely resembles that of *A. imalotensis* (described below), but the inflorescence characters, raceme 15—18 cm. long and narrowing to an acute apex, are nearer the typical form of *A. deltoideodonta*. Perrier 13496 is hardly a form of the var. *brevifolia*, and may represent an undescribed species.

The var. *brevifolia*, it seems, closely resembles typical *A. deltoideodonta* in rosettes, leaves and marginal teeth, but differs in having a lower inflorescence (30 cm. against 60 cm.) and shorter denser racemes (6—10 cm. long against 18 cm. long).

A. imalotensis Reynolds Spec. nov.—*A. deltoideodonta* Baker var. *contigua* H. Perrier in *Mém. Soc. Linn. Norm. (l.c.)* 25, et *Fl. Madag. (l.c.)* 86.

DESCRIPTION based on flowering plants near Ranohira and Benenitra:

Plants growing singly or in small groups, acaulescent or with short procumbent stem up to 10—20 cm. long, 3 cm. diam.



PLATE XXII. *A. deltoideodonta* Bak. var. *brevifolia* H. Perr.
 Photograph of the type, Perrier 12740, in Paris.
 —Photo by courtesy of Dr. R. A. Dyer, Chief, Division of Botany, Pretoria.



PLATE XXIII. *Aloe imalotensis* Reynolds.
On sandstone, 14 km. south-west of Ranohira, Ihosy Dist., Fianarantsoa Prov.,
Madagascar, 600 m. alt., 12 July 1955. Height 65 cm.



PLATE XXIV. *Aloe inulotensis* Reynolds.

On sandstone, 21 km. west of Benenitra, Betioky District, Tuléar Province, Madagascar, 270 m. alt., 10 July 1955. Height 60 cm.

Flowers 1/1 from a plant 14 km. south-west of Ranohira.



PLATE XXV. *Aloe intermedia* (H. Perr.) Reynolds.
 On rocks 52 km. north-east of Zazafotsy, Ihosy District, Fianarantsoa Province,
 Madagascar, 960 m. alt., 23 June 1955. Height 80 cm.
 Flowers 1/1 from bud to post-pollination stage.

Leaves 20—24, densely rosulate, compactly arcuate-ascending, broadly ovate-acute, up to 30 cm. long, 12—15 cm. broad, very fleshy; both *surfaces* dull bluish-green with reddish tinge, flat to slightly convex, obscurely lineate, without spots or markings; *margins* with 1 mm.-broad pink to reddish cartilaginous border armed with deltoid or obtuse pink teeth 1—1.5 mm. long, and varying from 1—4 mm. apart to sometimes contiguous.

Sap dries yellow.

Inflorescence a 2—4-branched erect or suberect panicle 50—65 cm. high, 2—3 simultaneously.

Peduncle basally plano-convex and 20 mm. broad, terete upwards, 2—4-branched from about the middle, the lowest branch subtended at base by a broadly ovate-acute bract which is thin, scarious, white, many-nerved.

Racemes subdensely flowered, cylindric slightly acuminate, 10—20 cm. long (15 cm. the average), 7 cm. diam., erect, buds sub-erect and grey-green tipped, older buds spreading, open flowers pendulous.

Bracts ovate-acute, thin, scarious, white, 7—10 mm. long, 3—4 mm. broad, 5-nerved, usually less than half the length of the pedicel.

Pedicels the lowest 15—18 mm. long.

Perianth cylindric slightly curved, coral-red, 30—34 mm. long, basally obtuse, 6 mm. diam. across the ovary, very slightly constricted above the ovary thence slightly decurved and slightly enlarging towards the throat; *outer segments* free almost to base, obscurely 3—5-nerved, the apices subacute and slightly spreading; *inner segments* broader than the outer, with broad white border, keeled throughout, the apices more obtuse and more spreading than the outer.

Filaments pale lemon, the 3 inner narrower and lengthening before the 3 outer with their *anthers* in turn exserted 1—2 mm.

Style lemon, with *stigma* at length exserted 2 mm.

Ovary pale green, 6 mm. long, 2.5 mm. diam., the apex truncate. (Plates XXIII—XXIV.)

Fianarantsoa Province. Ihosy District: On Triassic shale of the Imaloto Valley near Ranohira, 600 m. alt., July 1910, Perrier 11022! type (P); 14 km. south-west of Ranohira, c. 22° 37' S., 45° 21' E., c. 600 m. alt., 12 July 1955, Reynolds 7897 (TAN, P, K, PRE).

Tulear Province. Denuded sandstone, about 600 m. alt., Mont Ambohibe, Manombo du Sud, May 1910, Perrier 11019! (P); 21 km. west of Benenitra, c. 23° 26' S., 44° 54' E., c. 270 m. alt., 10 July 1955, Reynolds 7864 (TAN, P, K, PRE).

A. imalotensis is named after the area where plants occur in the largest numbers, namely, in the valley of the Imaloto River from near Ranohira

in the north (600 m.) to the Onilahy valley near Benenitra (270 m.) in the south.

These plants vary in too many characters to constitute a variety of *A. deltoideodonta* Bak. and they well merit specific rank.

Large numbers of *A. imalotensis* occur 14 km. and 19 km. east-north-east of Ranohira (770 m. alt.) In this area plants were found with short obtuse leaf marginal teeth that varied from contiguous to 1—4 mm. apart, hence Perrier's *forma longifolia* and *forma latifolia* are regarded as forms of this species.

In leaf characters *A. imalotensis* is closely allied to *A. Viguieri* H. Perr. near Tulear, but in *A. Viguieri* the inflorescence is simple, with very lax racemes and flowers only 22 mm. long.

In the Isalo range near Ranohira, rosettes of leaves with pink edge bear a striking resemblance to those of the South African species. *A. striata* Haw., but the latter has no marginal teeth, and a different inflorescence and flowers.

A. intermedia (H. Perr.) Reynolds. Spec. nov.—*A. deltoideodonta* Bak. var. *intermedia* H. Perr. in *Mém. Soc. Linn. Norm. (l.c.)* 24, et *Fl. Madag. (l.c.)* 86.

Plants of shrubby growth with erect, divergent, or procumbent creeping and rooting stems up to 1 m. long and 3 cm. diam., the apical 20 cm. or more subdensely foliate, with old dried leaf remains persistent.

Leaves about 20—26, rosulate, basally sheathing, lanceolate-attenuate, up to 25—30 cm. long in old specimens, 5—6 cm. broad; *upper surface* dull green with reddish tinge, without spots or markings, flat to slightly canaliculate; *lower surface* slightly rounded, dull green; *margins* armed with reddish-brown teeth that are paler at the tips and deltoid, 3—4 mm. long, 10 mm. apart in upper half, smaller and closer lower down.

Inflorescence about 60 cm. tall.

Peduncle basally plano-convex and 10 mm. broad, terete upwards, 2—3-branched from the middle or lower.

Racemes cylindric-acuminate, 10—15 cm. long, the apical buds denser suberect and hidden by their imbricate bracts, slightly laxer downwards with the open flowers nutant to subpendulous.

Bracts clasping the pedicel, lanceolate-acute, thin, subscarious, 12 mm. long, 3—5-nerved.

Pedicels 15 mm. long, the colour of the perianth, 20 mm. in the fruit.

Perianth reddish-scarlet, averaging 28 mm. long, obconic at base, 5 mm. diam. across the ovary, constricted to 4 mm. above the ovary, thence slightly decurved and enlarging to the throat; *outer segments* free for 11 mm., obscurely 3-nerved, the apices subacute and slightly spreading;

inner segments free but dorsally adnate to the outer to beyond the middle, broader than the outer and with more obtuse more spreading apices.

Filaments filiform-flattened, the 3 inner narrower and lengthening before the 3 outer with their *anthers* exerted 0—1 mm.

Stigma at length exerted 1 mm.

Ovary olive-green, 4.5 mm. long, 2 mm. diam., truncate at apex. (Plate XXV.)

Tulear Province: Between Itrongay and Benenitra west of Botroka, (Onilahy basin), c. 600 m. alt., Perrier 12690! type (P).

Fianarantsoa Province: South Betsileo, Ihosy District, on flat rocks, 52 km. north-east of Zazafotsy, c. 21° 57' S., 46° 26' E., c. 960 m. alt., 23 June 1955, Reynolds 7741 (TAN, K, PRE); same locality, 12 July 1955, Reynolds 7885 (TAN, K, PRE).

I could not reach Perrier's locality between Itrongay and Benenitra, but I found this species in considerable numbers about midway between Ambalavao and Zazafotsy in south Betsileo, on flat rocks 52 km. north-east of Zazafotsy. Large numbers occur on rocks 1—4 km. north of Zazafotsy, also between Zazafotsy and Ihosy, and east and south of Ihosy. A small form was found on the edge of the Horombe plateau at 1000 m. alt., about 40 km. south of Ihosy.

A. intermedia is a plant of shrubby growth with erect, divergent, or creeping and rooting procumbent stems up to 1 m. long in old specimens. It is nearest allied to *A. acutissima* H. Perr. in shrubby growth, racemes and shape of flowers, but the latter is of taller more erect growth, with more spreading comparatively narrower and longer leaves, smaller marginal teeth, and other differences.

Our third new species belongs to a very different group, namely *A. capitata* Bak. and varieties. This group is separated from all other groups of Malagasy Aloes by having globose to corymbose densely capitate racemes in which the uppermost pedicels are always much longer than the lowest ones.

On 17 June 1955, Mr. Descoings and I found many plants of a species high up on north-eastern slopes of Mont Ibity, near the top of a spur known locally as Koboui. This locality is west of the Manandona River about 5 km. above Ambolohiponana Village, at about 1600 m. alt., and c. 20° 05' S., 47° 01' E.

In *Mém. Soc. Linn. Norm. (l.c.)* 38, Perrier had described *A. capitata* Bak. var. *trachyticola* from mountains between the Ivato and Mania Rivers in the northern part of Fianarantsoa Province, (Perrier 11009), and from the top of Famoizankova, north of Antsirabe, at about 2200 m.

alt., in the southern part of Tananarive Province (Perrier 11100). Mont Ibity lies between these two localities.

I have not seen Perrier 11009, but I have recently examined Perrier 11100 and found that the Famoizankova and Mont Ibity plants are unquestionably one and the same species. But they differ in too many essential characters to constitute a variety of *A. capitata*, and they well merit distinct specific rank.

Leaves are distichous in young plants, becoming spirally twisted to rosulate with age; they are much shorter and narrower and are not of the kind associated with *A. capitata* and varieties.

The inflorescence is not branched.

The raceme is somewhat similar to *A. capitata* with the lowest pedicels much shorter than the uppermost ones, but is much smaller, and the lowest flowers open first, the apical ones last. In *A. capitata* the uppermost flowers open first.

The perianth is thick, fleshy, cylindric-trigonus, curved, and up to 35 mm. long with the anthers scarcely exerted, and is in all ways distinct from the campanulate flowers with 10 mm. exerted anthers of *A. capitata* and varieties.

The species can now be figured and more fully described, with Perrier's epithet retained:

A. trachyticola (H. Perr.) Reynolds, spec. nov.—*A. capitata* Bak. var. *trachyticola* H. Perr. in *Mém. Soc. Linn. Norm. (l.c.)* 38, et *Fl. Madag. (l.c.)* 103.

Plants solitary, mostly acaulous, but sometimes developing a procumbent stem.

Leaves 6—10 when young and distichous, up to 14 when spirally twisted to subrosulate, 10—15 cm. long, 3—4 cm. broad, the apex obtusely rounded and shortly-dentate; *upper surface* bluish-grey with reddish tinge; glabrous, flat to slightly concave; *lower surface* convex, similar in colour to upper surface; *margins* armed with reddish-brown teeth that are deltoid, pungent, 1—1.5 mm. long, 3—5 mm. apart.

Inflorescence simple, 65—90 cm. high.

Peduncle brown with a bloom, with a few sterile-bracts in upper half, the lowest ovate-cuspidate, 10 mm. long, 18 mm. broad, 5—7-nerved, smaller upwards.

Raceme densely capitate, the pedicellate part 2—3 cm. long, 7—8 cm. diam., the apex a tuft of dried bracts, the lowest flowers opening first, the uppermost last, the apical buds nutant, the lowest flowers pointing downwards and closely grouped around the axis.

Bracts ovate-acute, thin, 10 mm. long, 6 mm. broad at the middle, 5—7-nerved.



PLATE XXVI. *Aloe trachyticola* (H. Perr.) Reynolds.

Plant on a north-eastern spur of Mont Ibity, Tananarive Province, c. 20° 05' S.,
47° 01' E., c. 1,600 m. alt. Height 75 cm.



FIG. 1.



FIG. 2.

FIG. 1.

PLATE XXVII. *A. trachyticola* (H. Perr.) Reynolds.

FIG. 1. Upper portion of leaf 1/1 (upper surface).

FIG. 2. Flowers 1/1 from bud to post-pollination stage.

Pedicels the lowest 3—5 mm. long, gradually lengthening upwards, with the uppermost 15—20 mm. long.

Perianth red, up to 35 mm. long, cylindric-trigonus, slightly curved; *outer segments* free almost to base; *inner segments* broader than the outer, with 3 crowded nerves forming a prominent red keel, the apices more obtuse than the outer.

Filaments yellowish, the 3 inner narrower and lengthening before the 3 outer with their *anthers* in turn exerted 1—2 mm.

Stigma at length exerted 2—3 mm.

Ovary olive-brown, 7 mm. long, 3.5 mm. diam., tapering into the style. (Plates XXVI, XXVII.)

Tananarive Province: On trachytes, on the top of Famoizankova, north of Antsirabe, about 2,200 m. alt., March 1912, Perrier 11000! type (P); on a north-eastern spur of Mont Ibity, 1,600 m. alt., c. 20° 05' S., 47° 01' E., 17 June 1955, Reynolds 7688 (TAN), 7690 (PRE).

Fianarantsoa Province. On quartzites, mountains between the Ivato and Mania Rivers, about 1,400 m. alt., Perrier 11009 (P)—with slightly broader and shorter leaves and larger marginal teeth.

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